

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-78 are pending in the present application with Claims 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24-78 withdrawn from consideration. Claim 1 is amended by the present response.

In the outstanding Office Action, Claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 were rejected under 35 U.S.C. §112, second paragraph; and Claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 were rejected under 35 U.S.C. §103(a) as unpatentable over Kawakami et al. (U.S. Patent No. 6,563,318, herein “Kawakami”).

Regarding the rejection of Claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 under 35 U.S.C. §112, second paragraph, independent Claim 1 has been amended to recite prescribed time intervals in a first step, which is consistent with the language of a second step of Claim 1. The claim amendments find support in the specification, for example in paragraphs [0036] and [0037] of the publication of this application. No new matter has been added.

Accordingly, it is respectfully requested this rejection be withdrawn.

It is noted that the outstanding Office Action asserts at page 3, second full paragraph, that paragraph [0009] of the publication of this application discloses that certain steps are performed “simultaneously” and the claims are interpreted in this way. Applicant disagrees with this interpretation because paragraph [0009] is only one possible embodiment of this invention and for example, paragraph [0008] of the publication of this application discloses the steps being performed not simultaneously.

Thus, it is respectfully requested that the scope of the claims should not be interpreted based only on selected paragraphs of the specification.

The rejection of Claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 under 35 U.S.C. §103(a) as unpatentable over Kawakami is respectfully traversed for the following reasons.

Briefly recapitulating, independent Claim 1 is directed to a method of confirming a battery charge amount and a degradation state. The amendment includes, *inter alia*, measuring at a plurality of battery temperatures a cycle test battery in respect of one selected from battery open voltage, current and voltage during discharge, and current and voltage during charging at prescribed time intervals substantially until an end of life of the cycle test battery, using measured values to generate a determination table showing relationships between charge amounts and degradation states at the prescribed time intervals, measuring a subject battery in respect to one of the battery open voltage, the current and voltage during discharge, and the current and voltage during charging, and comparing determination table values with a measured value of the subject battery to confirm a present subject battery charge amount and degradation state in accordance with a determination table location of matching values.

As disclosed in paragraph [0036] of the publication of this application, one of the open voltage, current and voltage during discharging, and current and voltage during charging of the cycle test battery is measured at plural environmental temperatures, including low, normal, and high temperatures at prescribed time intervals until an end of life of the cycle test battery. Based on the data obtained from the measurements, the determination table is prepared as disclosed in paragraph [0037] of the publication of this application.

One of the above quantities is measured plural times for a subject battery and the results of the measurement are compared with the values in the determination table. Based on the locations of matching values specified in the determination table, a present charge quantity and degradation state of the subject battery can accurately be estimated in a short

period of time as disclosed for example in paragraphs [0038] and [0110] of the publication of this application.

Turning to the applied art, Kawakami discloses a method for detecting an internal state of an inspective rechargeable battery that includes (i) acquiring in advance of the measurements averaged basic data obtained from data of the voltage and the electricity storables capacity or discharge capacity of plural normal rechargeable batteries at various temperatures during charging and discharging using various degrees of electric currents, (ii) then measuring a voltage value or voltage and current values of the rechargeable batteries under detection, and (iii) comparing the measured values with the basic data to compute a remaining capacity of the rechargeable battery or a usable capacity thereof.

However, the basic data used by Kawakami does not correspond to that used by the method of Claim 1, in which various quantities are measured at prescribed time intervals until the end of life of the cycle test battery.

The basic data of Kawakami is obtained, for example, through the repetition of an intermittent discharge action of a rechargeable battery taken until reaching a cutoff voltage set beforehand, which action is to subject the rechargeable battery to discharge at a discharging current of 0.2 C (at the 5 hour rate) for 15 minutes (discharge in an electricity quantity corresponding to about 5% of the nominal electric capacity of the rechargeable battery) and then pause the rechargeable battery as disclosed by Kawakami at column 51, line 45 to column 52, line 57.

Thus, it is respectfully submitted that Kawakami does not teach or suggest the measurement being made plural times until the end of life of the battery as is performed by the method of Claim 1.

Further, as described in Kawakami at column 5, line 1 to column 6, line 23 and at column 11, line 1 to column 14, line 29, the basic data also includes averaged data obtained

from the voltage and the electricity storability capacity or discharge capacity of the battery measured after charging and discharging plural normal (not degraded) rechargeable batteries performed in advance using various temperatures and various degrees of currents and data obtained through computer simulations prior to measuring the subject battery.

Furthermore, Kawakami discloses at column 51, line 45 to column 53, line 35 and at column 11, line 1 to column 14, line 29 that the basic data is based not only on the actually measured data, but also on data obtained through computer simulations.

Because a battery uses chemical reactions to generate electricity, batteries having the same active material or rating can have different preset charge quantities or different degradation states depending on a state in which each battery is kept and used, a temperature, and other environmental factors. Thus, as disclosed in paragraph [0005] of the publication of this application, it is not possible to accurately display a remaining charge and a degradation state of a subject battery when using approximate data obtained through computer simulations as disclosed in Kawakami.

On the contrary, the claimed values constituting the determination table of the method of Claim 1 are measured values and not simulated values. Accordingly, Applicant respectfully submits that the battery charge amount of the battery under test can accurately be measured by the method of Claim 1 in a short period of time as disclosed in paragraph [0110] of the publication of this application.

Actually measured data constituting the determination table of the method of Claim 1 is obtained from the actual measurements made using plural environmental temperatures until the end of life of the cycle test battery. Therefore, the charge amount and the degradation state provided by the method of Claim 1 can accurately be determined in a short period of time irrespective of how the battery under test is used, as disclosed in paragraph [0111] of the publication of this application.

In addition, because the determination table used by the method of Claim 1 is based as stated above on actually measured data (see also paragraph [0083] of the publication of this application), increasing the number of measurements of the voltage or the voltage and current of the battery under test enables the method of Claim 1 to more accurately determine the present charge amount and the degradation state of the battery under test than the method of Kawakami for the reasons discussed next.

Because Kawakami uses the basic data obtained not only from the actually measured data, but also data obtained from the computer simulations, errors produced by the computer simulations are present. By increasing the number of times the actually measured data and the simulated data is used, it is likely that the errors introduced by the simulated data is increased in Kawakami due to the cumulative effect of the errors.

Therefore, Applicant respectfully submits that the differences discussed above the claimed method and the method of Kawakami advantageously allow the claimed method to measure with higher accuracy and in a shorter period of time the charge amount and the state of degradation of the subject battery comparative to the method of Kawakami.

Accordingly, it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Kawakami.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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